



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

the Patent Application of

Hideo YAMANAKA et al.

Art Unit: 1762

Application No.: 09/646,680

Examiner: Eric B. Fuller

Filed: November 4, 2000

For: FILM FORMING METHOD AND FILM FORMING APPARATUS

SUPPLEMENTAL APPEAL BRIEF

Mail Stop Appeal Brief-Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This is a Supplemental Appeal Brief, submitted under 37 C.F.R. §§ 1.192 and 1.193(b)(2)(ii), requesting reinstatement of the Appeal in response to the non-rejection of the Examiner dated June 3, 2003 (Paper No. 16) reopening prosecution of this case.

Each of the topics required by Rule 192 is presented herewith and is labeled appropriately.

I. Real Party In Interest

Sony Corporation of Tokyo, Japan ("Sony") is the real party in interest of the present application. An assignment of all

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rights in the present application to Sony was executed by the inventor and recorded by the U.S. Patent and Trademark Office at **reel 011468, frame 0426.**

II. Related Appeals And Interferences

There are no appeals or interferences related to the present application of which Appellant is aware.

III. Status of Claims

Claims 1-45 were originally filed in this application.

Claims 3-7, 10-13, 15, 18, 19, and 22-45 were withdrawn by the Examiner in the Office Action of Paper No. 7, mailed on March 27, 2002.

Thus, the Appellant hereby appeals the rejection of claims 1-2, 8-9, 14, 16-17 and 20-21, which are presented in the Appendix.

IV. Status of Amendments

No Amendment to the claims has been filed subsequent to the Office Action of June 3, 2003.

V. Summary of the Invention

This invention relates to a film forming method and a film forming apparatus for vapor growth of a predetermined film made of polycrystal silicon or the like.

Within the claimed invention, a reaction gas 40 is brought into contact with a heated catalyzer 46 and an electric field of not higher than a glow discharge starting voltage is caused to act on the produced reactive species (page 21, lines 1-4), thereby providing kinetic energy and carrying out vapor growth of a predetermined film on a base 1.

VI. References of Record

In the rejection of June 3, 2003, the Examiner relied upon:

U.S. Patent No. 4,961,958, Desphandey et al. (Desphandey).

U.S. Patent No. 5,900,161 issued to Doi.

U.S. Patent No. 5,464,499, Moslehi et al. (Moslehi).

U.S. Patent No. 3,769,670 issued to Schrank.

VII. Issues

The issues presented for consideration in this appeal are as follows:

Whether the Examiner erred in rejecting claims 1, 2, 16, 17 and 20 under 35 U.S.C. §102 as being allegedly anticipated by Desphandey.

Whether the Examiner erred in rejecting claim 14 under 35 U.S.C. §103 as being allegedly obvious over Desphandey in view of Doi.

Whether the Examiner erred in rejecting claims 8 and 9 under 35 U.S.C. §103 as being allegedly obvious over Desphandey in further view of Doi and Moslehi.

Whether the Examiner erred in rejecting claim 21 under 35 U.S.C. §103 as being allegedly obvious over Desphandey in further view of Shranks.

These issues will be discussed hereinbelow.

VIII. Grouping of Claims

For purposes of the issues presented by this appeal:

Claims 1-2, 16-17 and 20 stand or fall together.

Claims 8-9 stand or fall together.

Claim 14 stands or falls alone.

Claim 21 stands or falls alone.

The arguments set forth in the following section provide reasons why these groups are considered separately patentable, 37 C.F.R. 1.192 (c) (7).

IX. Arguments

In the Office Action of June 3, 2003:

The Examiner rejected claims 1, 2, 16, 17 and 20 under 35 U.S.C. §102 as being allegedly anticipated by Desphandey.

The Examiner rejected claim 14 under 35 U.S.C. §103 as being allegedly obvious over Desphandey in view of Doi.

The Examiner rejected claims 8 and 9 under 35 U.S.C. §103 as being allegedly obvious over Desphandey in further view of Doi and Moslehi.

The Examiner rejected claim 21 under 35 U.S.C. §103 as being allegedly obvious over Desphandey in further view of Shrunk.

For at least the following reasons, Appellant submits that

these rejections are both technically and legally unsound and should therefore be reversed.

Information Disclosure Statement

Within the Office Action of June 3, 2003, the rejection of the claims include the use of Desphandey and Moslehi. However, these references are neither acknowledged on Form PTO-1449 or provided on Form-892.

Applicant respectfully requests that references Desphandey and Moslehi be formally be made of record in the present application, and that an initialed copy of Form PTO-1449 or a copy of Form-892 be provided in accordance with M.P.E.P §609.

Petition

A petition under 37 C.F.R. § 1.144 requesting review of the restriction requirement made by the Examiner within the Office Action mailed on December 21, 2001, which has been maintained in the Office Action of June 3, 2003. No decision on this petition has been provided. Accordingly, timely consideration of this petition is respectfully requested.

General Matters

M.P.E.P. 707.07(f) states that "the importance of answering such arguments is illustrated by *In re Herrmann*, 261 F.2d 598, 120 USPQ 182 (CCPA 1958) where the applicant urged that the subject matter claimed produced new and useful results. The court noted that since applicant's statement of advantages was not questioned by the examiner or the Board of Appeals, it was constrained to accept the statement at face value and therefore found certain claims to be allowable. See also *In re Soni*, 54 F.3d 746, 751, 34 USPQ2d 1684, 1688 (Fed Cir. 1995) (Office failed to rebut applicant's argument)."

Anticipation, generally

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

Obviousness, generally

As a rule, "obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching suggestion or incentive supporting the

combination" (*emphasis added*). *In re Geiger*, 2 USPQ2d 1276, 1278 (Fed. Cir. 1987) (obviousness rejection reversed due to lack of teaching suggestion or incentive to support the examiner's combination).

THE EXAMINER ERRED IN REJECTING CLAIMS 1, 2, 16, 17 AND 20 UNDER
35 U.S.C. §102 AS BEING ALLEGEDLY ANTICIPATED BY DESPHANDEY.

This rejection is traversed at least for the following reasons.

Claim 1 and the claims dependent thereon are drawn to a film forming method in which a reaction gas is brought into contact with a heated catalyzer and an electric field of not higher than a glow discharge starting voltage is caused to act on the produced reactive species, thereby providing kinetic energy and carrying out vapor growth of a predetermined film on a base.

Desphandey arguably teaches a process for making diamond, and doped diamond films at low temperature having a tungsten filament 46 that is thermionically heated using a supply 47 via line 48 for providing electrons for dissociating and ionizing the

gases and the evaporated carbon vapor (figure, column 4, lines 51-54, column 5, lines 43-45).

However, a method wherein an electric field of not higher than a glow discharge starting voltage is caused to act on the produced reactive species is not found within Desphandey.

Specifically, within the Office Action, the Examiner interprets 80 volts within Desphandey to be below the glow discharge starting voltage. However, this interpretation fails in that the gases used within Desphandey are different from the gases of the above-identified application.

In addition, since no plasma is generated within the invention of the above-identified application, there is no damage due to plasma and a film of low stress is provided (specification page 6, lines 9-10). Conversely, Desphandey provides that carbon is evaporated in a vacuum chamber in the presence of atomic hydrogen containing plasma to form diamond precursors that is deposited on a substrate located within the vacuum chamber (abstract, column 3, lines 26-31, column 9, lines 51-54).

Thus, Desphandey fails to disclose, teach or suggest a method wherein an electric field of not higher than a glow discharge starting voltage is caused to act on the produced reactive species, especially noting the existence of a plasma within the invention of Desphandey.

THE EXAMINER ERRED IN REJECTING CLAIM 14 UNDER 35 U.S.C. §103 AS BEING ALLEGEDLY OBVIOUS OVER DESPHANDEY IN VIEW OF DOI.

This rejection is traversed at least for the following reasons.

In addition to the reasons provided hereinabove with regard to claim 1, this rejection is traversed at least for the following reasons.

Within claim 14, after vapor growth of the predetermined film, the base is taken out of a deposition chamber and a voltage is applied between predetermined electrodes to generate plasma discharge, thereby cleaning the inside of the deposition chamber with the plasma discharge.

The Office Action admits that Desphandey fails to disclose, teach or suggest a process of cleaning the deposition chamber after the coated substrate has been taken out, and cites Doi for the features deficient within Desphandey.

However, note that there is no teaching within Desphandey or Doi that the apparatus of Doi is suitable for performing the process of Desphandey. Specifically, there is no teaching within Desphandey or Doi that the apparatus of Doi is suitable for performing the catalytic CVD process of Desphandey. For example, note that a catalyster is nonexistent within Doi. As such, proper motivation to combine the teachings of Desphandey and Doi is absent.

In addition, Doi fails to disclose, teach or suggest, that after vapor growth of the predetermined film, the base is taken out of a deposition chamber and a voltage is applied between predetermined electrodes to generate plasma discharge, thereby cleaning the inside of the deposition chamber with the plasma discharge.

THE EXAMINER ERRED IN REJECTING CLAIMS 8 AND 9 UNDER 35 U.S.C.

§103 AS BEING ALLEGEDLY OBVIOUS OVER DESPHANDEY IN FURTHER

VIEW OF DOI AND MOSLEHI.

In addition to the reasons provided hereinabove with regard to claim 1, this rejection is traversed at least for the following reasons.

Within claims 8 and 9, the catalyster is arranged between the base and an electrode for applying the electric field.

However, Desphandey, Doi and Moslehi, either individually or as a whole, fail to disclose, teach or suggest a catalyster arranged between the base and an electrode for applying the electric field.

In particular, claim 1 provides that a reaction gas is brought into contact with a heated catalyster and an electric field of not higher than a glow discharge starting voltage is caused to act on the produced reactive species, thereby providing kinetic energy and carrying out vapor growth of a predetermined film on a base. Claim 8 is dependent upon claim 1.

While Desphandey arguably teaches a catalyster 46 (figure), Desphandey fails to disclose, teach or suggest catalyster 46

arranged between the base 26 and electrode 49 for applying the electric field, wherein vapor growth of a predetermined film is carried out on the base.

Doi and Moslehi, either individually or as a whole, fail to disclose, teach or suggest the existence of a catalyzer arranged between the base and an electrode for applying the electric field.

THE EXAMINER ERRED IN REJECTING CLAIM 21 UNDER 35 U.S.C. §103 AS
BEING ALLEGEDLY OBVIOUS OVER DESPHANDEY IN FURTHER VIEW OF
SHRANK.

In addition to the reasons provided hereinabove with regard to claim 1, this rejection is traversed at least for the following reasons.

Within claim 21, the catalyzer is heated in a hydrogen-based gas atmosphere before supplying the material gas.

The Office Action cites Shranks for the features deficient within Desphandey. Note, there is no teaching within Desphandey or Shranks that the method of Shranks is suitable for performing

the process of Desphandey. Specifically, there is no teaching within Desphandey or Shrake that the method of Shrake is suitable for performing the catalytic CVD process of Desphandey. For example, note that a catalyst is nonexistent within Shrake. As such, proper motivation to combine the teachings of Desphandey Shrake is absent.

In addition, Shrake arguably teaches a process of manufacturing tungsten filaments for an incandescent lamp (claim 1), and arguably teaches that this treatment increases the life of an incandescent lamp (column 1, lines 41-43). Thus, there is no teaching in the cited prior art as to why the skilled artisan in the chemical vapor deposition art would have looked to the incandescent light art, and specifically to Shrake, for the features deficient within Desphandey.

As a result, Desphandey and Shrake, either individually or as a whole, fail to disclose, teach or suggest the catalyst being heated in a hydrogen-based gas atmosphere before supplying the material gas of Desphandey.

X. Conclusion

Desphandey fails to anticipate Applicant's invention, and

Desphandey, Doi, Moslehi and Shrank, either individually or as a whole, fail to disclose, teach or suggest at least the above-noted features of the claimed invention at the time the invention was made, and therefore, does not render Applicant's invention obvious.

Thus, the claims are considered allowable for the same reasons discussed above, as well as for the additional features they recite, and particularly in light of the cited prior art.

In view of the foregoing, it is submitted that the rejection of claims 1-2, 8-9, 14, 16-17 and 20-21 is improper and should not be sustained. Therefore, a reversal of the Rejection of June 3, 2003 as to claims 1-2, 8-9, 14, 16-17 and 20-21 is respectfully requested.

Respectfully submitted,

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XI. APPENDIX

Claims on Appeal

1. A film forming method in which a reaction gas is brought into contact with a heated catalyst and an electric field of not higher than a glow discharge starting voltage is caused to act on the produced reactive species, thereby providing kinetic energy and carrying out vapor growth of a predetermined film on a base.
2. The film forming method as claimed in claim 1, wherein a DC voltage not higher than the glow discharge starting voltage is applied to direct the reactive species toward the base.
8. The film forming method as claimed in claim 1, wherein the catalyst is arranged between the base and an electrode for applying the electric field.
9. The film forming method as claimed in claim 8, wherein a gas supply port for leading out the reaction gas is formed in the electrode.
14. The film forming method as claimed in claim 1, wherein after vapor growth of the predetermined film, the base is taken

out of a deposition chamber and a voltage is applied between predetermined electrodes to generate plasma discharge, thereby cleaning the inside of the deposition chamber with the plasma discharge.

16. The film forming method as claimed in claim 1, wherein the catalyster is heated to a temperature within a range of 800 to 2000°C and lower than its melting point, and the reactive species, produced by catalytic reaction or thermal decomposition of at least a part of the reaction gas with the heated catalyster, are used as material species so as to deposit a thin film by a thermal CVD method on the base heated to the room temperature to 550°C.

17. The film forming method as claimed in claim 16, wherein the catalyster is heated by its own resistance heating.

20. The film forming method as claimed in claim 1, wherein the catalyster is made of at least one type of material selected from the group consisting of tungsten, thoria-containing tungsten, titanium, molybdenum, platinum, palladium, vanadium, silicon, alumina, ceramics with metal adhered thereto, and silicon carbide.

21. The film forming method as claimed in claim 1, wherein the catalyster is heated in a hydrogen-based gas atmosphere before supplying the material gas.